| Notice of Allowability | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/753,332 | COATES, JOSHUA | |
| | Examiner | Art Unit | |
| | Joon H. Hwang | 2166 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--***

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Caroline M. Fleming (Reg. No. 45,566) on 5/10/07*.

2. ☒ The allowed claim(s) is/are *1,4-11,14-21 and 24-35 (renumbered as 1-29)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   **Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 11/20/06
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

## DETAILED ACTION

1. The applicant amended claims 1, 11, and 21 and added new claims 33-35 in the amendment filed on 3/16/07.

The pending claims are 1-35.

## EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

3. Authorization for this examiner's amendment was given in a telephone interview with Caroline M. Fleming (Reg. No. 45,566) on 5/10/07.

4. The application has been amended as follows:

Rewrite claim 1 as follows:

"1. A method comprising:

providing a plurality of distributed object storage managers "DOSMs"' for receiving requests for files in a network storage file system;

providing at least three intelligent storage nodes directly being accessed to each of said DOSMs over a wide area, public access network coupling the DOSMs to the intelligent storage nodes, said intelligent storage nodes being accessed to said DOSMs

via public access network addresses associated with said intelligent storage nodes, each intelligent storage node including a processor core and a plurality of storage devices;

storing at least one file in a first intelligent storage node accessed via a DOSM over said network;

storing a duplicate of said file in a second intelligent storage node accessed via said network;

in an event of a failure of said first intelligent storage node resulting in a failover condition rendering said first intelligent storage node unavailable, upon receiving a request for said file by said DOSM, identifying by said DOSM that said second intelligent storage node stores said duplicate of said file, redirecting said file request, via said network, to said second intelligent storage node and indicating a location determined at said DOSM for said file in said second intelligent storage node; and

accessing, via said network, said file stored in said second intelligent storage node in response to said file request or a subsequent file request, wherein

storing at least one file in a first intelligent storage node accessed via a DOSM over said network comprises accessing said first intelligent storage node via a first network address;

storing a duplicate of said file in a second intelligent storage node accessed via said network comprises accessing said second intelligent storage node via a second network address; and

determining a location for said file in said second intelligent storage node comprises generating a mapping between said first network address and said second network address, wherein said first network address and said second network address comprise internet protocol ("IP") network addresses and differ only in a subnet portion of said IP network addresses.";

Cancel claim 2;

Cancel claim 3;

Rewrite claim 5 as follows:

"5. The method as set forth in claim 4, further comprising:

storing a plurality of files in a plurality of intelligent storage nodes in said first storage center;

storing duplicates of said plurality of files in a plurality of intelligent storage nodes in said second storage center, so as to provide a one to one mapping between said intelligent storage nodes in said first storage center and said intelligent storage nodes in said second storage center.";

Rewrite claim 7 as follows:

"7. The method as set forth in claim 1, wherein:

storing at least one file in a first intelligent storage node comprises:

storing said file in a first storage center comprising a plurality of intelligent storage nodes; and

storing said duplicate of said file in a second storage center, geographically distant from said first storage center; and

determining a location for said file in said second intelligent storage node comprises searching for said file in said second storage center after entering said failover condition.";

Rewrite claim 11 as follows:

"11. A distributed storage system comprising:

a wide area, public access network;

at least three intelligent storage nodes, each intelligent storage node including a processor core and a plurality of storage devices;

a first intelligent storage node having multiple storage devices, accessed via said network and storing at least one file in a network storage file system;

a second intelligent storage node having multiple storage devices, accessed via said network with a public access network address, and storing a duplicate of said file; and

a plurality of distributed object storage managers (DOSMs) remote from said storage nodes, any one of said DOSMs directly accessing, via an interconnection over said network, said file stored in said first intelligent storage node in response to a file request, in an event of a failure of said first intelligent storage node resulting in a failover

condition rendering said first intelligent storage node unavailable, upon receiving the request for said file by said DOSM, identifying by said DOSM that said second intelligent storage node stores said duplicate of said file, redirecting said file request to said second intelligent storage node, via said network, indicating a location for said file in said second intelligent storage node and directly accessing, via said interconnection over said network, said file stored in said second intelligent storage node in response to said file request or a subsequent file request, wherein

said DOSM further accessing said first intelligent storage node via a first network address and accessing said second intelligent storage node via a second network address, said DOSM further generating a mapping between said first network address and said second network address, wherein said first network address and said second network address comprise internet protocol ("IP") network addresses and differ only in a subnet portion of said IP network addresses.";

Cancel claim 12;

Cancel claim 13;

Rewrite claim 15 as follows:

"15. The distributed storage system as set forth in claim 14, wherein:

said first storage center comprises a plurality of files stored in a plurality of intelligent storage nodes; and

said second storage center comprises duplicates of said plurality of files stored in a plurality of intelligent storage nodes, so as to provide a one to one mapping between said intelligent storage nodes in said first storage center and said intelligent storage nodes in said second storage center.";

Rewrite claim 17 as follows:

"17. The distributed storage system as set forth in claim 11, further comprising:

a first storage center comprising a plurality of intelligent storage nodes for storing said file;

a second storage center, geographically distant from said first storage center, for storing said duplicate of said file; and

said DOSM searching for said file in said second storage center after entering said failover condition.";

Rewrite claim 18 as follows:

"18. The distributed storage system as set forth in claim 17,

wherein said DOSM further comprises processes searching for said file in said first storage center if said file is not located in said second storage center.";

Rewrite claim 21 as follows:

"21. A distributed storage system comprising:

a wide area, public access network;

at least three intelligent storage nodes, each intelligent storage node including a processor core and a plurality of storage devices; and

a distributed virtual file system comprising:

at least three directories;

a first directory, remote from a requesting client and from an associated intelligent storage node, accessed via said network, storing file system information associated with said intelligent storage node;

a second directory, accessed via said network, storing a duplicate of said file system information; and

at least one distributed directory manager (DDM) directly accessing, via said network, said file system information stored in said first directory in response to a file system request for a file in a network storage file system, and redirecting, in an event of a failure of said first directory resulting in a failover condition rendering said first directory unavailable, the file system request from said first directory to said second directory, via said network, indicating a location for said file system information in said second directory, and directly accessing, via said network, said file system information stored in said second directory in response to said redirected file system request, wherein

said DDM further accessing said first directory via a first network address and accessing said second directory via a second network address, said DDM further generating a mapping between said first network address and said second network address, wherein said first network address and said second

network address comprise internet protocol ("IP") network addresses and differ only in a subnet portion of said IP network addresses.";

Cancel claim 22;

Cancel claim 23;

Rewrite claim 24 as follows:

"24. The distributed storage system as set forth in claim 21, wherein:

a first storage center comprising said first directory; and

a second storage center, geographically distant from said first storage center, comprising said second directory.";

Rewrite claim 25 as follows:

"25. The distributed storage system as set forth in claim 24, wherein:

said first storage center comprises file system information stored in a plurality of directories; and

said second storage center comprises a duplicate of said file system information stored in a plurality of directories, so as to provide a one to one mapping between said directories in said first storage center and said directories in said second storage center.";

Rewrite claim 26 as follows:

"26. The distributed storage system as set forth in claim 21, wherein said first and second directories reside in a single storage center.";

Rewrite claim 27 as follows:

"27. The distributed storage system as set forth in claim 21, further comprising:

a first storage center comprising a plurality of directories for storing said file system information;

a second storage center, geographically distant from said first storage center, for storing a duplicate of said file system information; and

said DDM searching for said file system information in said second storage center after entering said failover condition.";

Rewrite claim 28 as follows:

"28. The distributed storage system as set forth in claim 27, wherein said DDM further comprises processes searching for said file system information in said first storage center if said file system information is not located in said second storage center.";

Rewrite claim 29 as follows:

"29. The distributed storage system as set forth in claim 27, wherein a multi-cast protocol is used for communicating among said DDM and said directories.";

Rewrite claim 30 as follows:

"30. The distributed storage system as set forth in claim 27, wherein a point-to-point protocol is used for communicating between said DDM and one of said directories.";

Rewrite claim 31 as follows:

"31. The distributed storage system as set forth in claim 11, wherein the processor core communicates with the storage devices using ISA protocol.";

Rewrite claim 32 as follows:

"32. The distributed storage system as set forth in claim 11, wherein the processor core communicates with the storage devices using SCSI protocol.";

Rewrite claim 33 as follows:

"33. The method of claim 1, wherein each intelligent storage node includes volatile memory, a network interface and a file system directory and each of the plurality of storage devices is a disk drive.";

***Allowable Subject Matter***

5. Claims 1, 4-11, 14-21, and 24-35 are allowed.

Claims 1 and 11 identify the distinct features, at least three intelligent storage nodes, each intelligent storage node including a processor core and a plurality of storage devices; a plurality of distributed object storage managers (DOSMs), each/any one of said DOSMs directly accessing, over said network, said first intelligent storage node; identifying by said DOSM that said second intelligent storage node stores said duplicate of said file; indicating a location for said file in said second intelligent storage node; accessing, via said network, said file stored in said second intelligent storage node in response to said file request or a subsequent file request; and generating a mapping between said first network address and said second network address, wherein said first network address and said second network address comprise internet protocol ("IP") network addresses and differ only in a subnet portion of said IP network addresses, which are not taught or suggested by the prior art of records.

Claim 21 identifies the distinct features, at least three intelligent storage nodes, each intelligent storage node including a processor core and a plurality of storage devices; and a distributed virtual file system comprising: at least three directories; a first directory, remote from a requesting client and from an associated intelligent storage node, accessed via said network, storing file system information associated with said intelligent storage node; at least one distributed directory manager (DDM) directly accessing, via said network, said file system information stored in said first directory, indicating a location for said file system information in said second directory, and directly accessing, via said network, said file system information stored in said second directory in response to said redirected file system request, wherein said DDM further

generating a mapping between said first network address and said second network address, wherein said first network address and said second network address comprise internet protocol ("IP") network addresses and differ only in a subnet portion of said IP network addresses, which are not taught or suggested by the prior art of records. The closest prior art, Bergsten (U.S. Patent No. 6,360,306) disclosing a distributed storage system, fails to suggest the claimed limitations as mentioned above in combination with other claimed elements. The above features in conjunction with all other limitations of the dependent and independent claims 1, 4-11, 14-21, and 24-35 are hereby allowed.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joon H. Hwang whose telephone number is 571-272-4036. The examiner can normally be reached on 9:30-6:00(M~F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain T. Alam can be reached on 571-272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Joon Hwang
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5/11/07